

II. AMENDMENTS TO THE CLAIMS:

Please cancel claims 1, 5, 6 and 11 without prejudice. Kindly amend claims 2-4, 7-10 and 12-17, and add new claims 18 and 19 as follows.

The following claims will replace all prior versions of claims in the present application.

LISTING OF CLAIMS:

1. (Cancelled)
2. (Currently Amended) A differential pressure type flowmeter comprising:
an orifice;
a detector disposed to detect a fluid pressure P1 on an the upstream side of the an orifice;
a detector disposed to detect a fluid pressure P2 on a the downstream side of the an orifice;
a detector disposed to detect a fluid temperature T on the upstream side of the an orifice; and
a control computation circuit that computes to compute a fluid's flow rate Q passing through the an orifice with the pressure P1 and pressure P2 and temperature T detected by the aforementioned detectors, wherein the ~~aforementioned~~ control computation circuit is installed with a flow rate computation circuit employing ~~where~~ with an equation $Q = C1 \cdot P1 \sqrt{T \cdot ((P2/P1)^m - (P2/P1)^n)^{1/2}}$, (where C1 is a proportional constant, and m and n are constant), to compute fluid's flow rate Q, and further comprising a correction data memory circuit wherein changes in the pressure P2 on the downstream side of the an orifice are obtained by actual measurements by the detector disposed to detect fluid pressure P2 on the downstream side of

~~the orifice beforehand~~ and flow rate errors of the aforementioned fluid's flow rate Q are ~~storable in the correction data memory circuit~~, and a flow rate correction computation circuit ~~corrects to correct the aforementioned~~ computed fluid's flow rate Q with the correction data from the correction data memory circuit, thus the computed fluid's flow rate Q ~~is being~~ corrected depending on changes of a pressure P_2 on the downstream side of ~~the an~~ orifice, to output a corrected flow rate value Q .

3. (Currently Amended) A differential pressure type flowmeter as claimed in Claim 2, wherein said control computation circuit further comprises

a pressure ratio computation circuit ~~that computes to compute~~ a ratio of ~~the a~~ fluid pressure P_1 on the upstream side of ~~the an~~ orifice and ~~the a~~ fluid pressure P_2 on the downstream side of ~~the an~~ orifice;

a critical condition judgment circuit ~~that judges to judge~~ a state of a fluid by comparing the ~~aforementioned~~ computed pressure ratio and a fluid's critical pressure ratio; and

a No.2 flow rate computation circuit ~~that computes to compute a fluid's flow rate~~ Q by using the equation $Q=KP_1$ (where K is a proportional constant) when the fluid is under critical conditions, thus outputting ~~the a~~ fluid's flow rate Q computed with the ~~aforementioned~~ No.2 flow rate computation circuit when the fluid is under critical conditions, and also outputting a fluid's flow rate value Q' corrected ~~using with~~ the flow rate correction computation circuit when the fluid is under non-critical conditions.

4. (Currently Amended) A differential pressure type flowmeter characterized in that flow rate measurements ~~are can be~~ performed with high accuracy over a wide flow rate range by combining a first differential pressure type flowmeter for measuring a flow rate

range of 100%-10% of the maximum flow rate range and a second differential pressure type flowmeter for measuring a flow rate range of 10%-1% of the maximum flow rate range, and by switching a fluid to be measured in accordance with the aforementioned flow rate ranges using a switching valve, to supply the fluid to the first and second differential pressure type flowmeters, wherein one of the first and second differential pressure type flowmeters is a differential pressure type flowmeter comprising:

an orifice;

a detector disposed to detect fluid pressure P1 on an upstream side of the orifice;

a detector disposed to detect fluid pressure P2 on a downstream side of the orifice;

a detector disposed to detect fluid temperature T on the upstream side of the orifice;

and

a control computation circuit that computes a fluid's flow rate passing through the orifice with the pressure P1, wherein pressure P2 and temperature T are detected by the aforementioned detectors, and the fluid's flow rate Q is computed using equation $Q = C1 \cdot P1 \sqrt{T} \cdot ((P2/P1)^m - (P2/P1)^n)^{1/2}$, where C1 is a proportional constant, and m and n are constants according to claim 1.

5. (Cancelled)

6. (Cancelled)

7. (Currently Amended) A differential pressure type flowmeter comprising: characterized by that it is so constituted that by forming it with

(a) a valve body comprising 12 provided with

i. a fluid inlet; a;

- ii. a fluid outlet; ~~b~~;
- iii. a first mounting hole, ~~17a~~ for ~~a~~ the No.1 switching valve ~~10~~, formed in the valve body;
- iv. a second mounting hole, ~~17b~~ for ~~a~~ the No.2 switching valve ~~11~~, formed in the valve body;
- v. a third mounting hole, ~~18a~~ for a fluid pressure detector-~~2~~ disposed on ~~an~~ the upstream side of an orifice, formed in the valve body;
- vi. a fourth mounting hole, ~~18b~~ for a fluid pressure detector-~~3~~ disposed on ~~a~~ the downstream side of ~~the~~ an orifice, formed in the valve body;
- vii. a fifth mounting hole, ~~19~~ for a fluid temperature detector-~~4~~ disposed on the upstream side of ~~the~~ an orifice, formed in the valve body;
- viii. first, second and third fluid passages disposed to pass fluid from ~~16a, 16b and 16e for directly passing through~~ thea fluid inlet through the valve body, wherein the undersides of the firsta mounting hole 17a for the No.1 switching valve 10, the thirda mounting hole 18a for thea fluid pressure detector-2 disposed on the upstream side of thean orifice and thea second mounting hole 17b for the No.2 switching valve 11 which are made in an the interior of the aforementioned valve body 12;
- ix. a fourth fluid passage disposed to communicate with ~~16f for communication of the underside of the firsta mounting hole-17a for the No.1 switching valve and the underside of the seconda mounting hole-17b for the No.2 switching valve;~~ ~~11~~;
- x. a fifth fluid passage disposed to communicate with ~~16e for communication of the underside of the seconda mounting hole-17b for the No.2 switching valve-11 and the underside of the fourtha mounting hole-18b for the fluid pressure detector-3 disposed on the downstream side of thean orifice;~~ and

xi. a sixth fluid passage 16d disposed to communicate with~~for communication~~
~~of the underside of the fourth mounting hole 18b for the pressure detector 3~~ disposed
on the downstream side of the an orifice and the a fluid outlet;~~b;~~

(b) the a fluid pressure detector disposed 2 on the upstream side of the an orifice and
fixed to the third mounting hole;~~and~~

(c) the a fluid pressure detector disposed on the downstream side of the orifice and 3
fixed to the fourth mounting hole;~~mentioned mounting holes 18a and 18b respectively;~~

(d) the a fluid temperature detector disposed 4 on the upstream side of the an orifice and
fixed to the fifth mounting hole;

(e) the No.1 switching valve fixed to the first mounting hole, wherein the No.1
switching valve conducts 10~~where~~with opening and closing are conducted between the
third~~mentioned~~ fluid passage 16e and the fourth fluid passage;~~16f;~~

(f) the No.2 switching valve fixed to the second mounting hole, wherein the No.2
switching valve conducts 11~~where~~with opening and closing are conducted between the
second~~mentioned~~ fluid passage 16b and the fifth fluid passage;~~16e;~~ wherein the orifice
comprises an orifice 1' for a small flow quantity installed halfway on the fourth~~to the~~
mentioned fluid passage and 16f; an orifice 1'' for a large flow quantity installed on the
first~~mentioned~~ fluid passage 16a or on the second fluid passage 16b, and a control
computation circuit compute~~test~~ to compute a fluid's flow rate Q passing through the an orifice
1' for a small flow quantity and the an orifice 1'' for a large flow quantity depending on the
pressure P1, pressure P2 and temperature T detected by the aforementioned fluid pressure
detectors 2 and 3 and the temperature detector 4, respectively, by using the equation $Q=C1 \cdot$
 $P1/\sqrt{T} \cdot ((P2/P1)^m - (P2/P1)^n)^{1/2}$, where C1 is a proportional constant, and m and n are
constants, so that when~~thus making it possible that a flow rate measured by the differential~~
pressure type flowmeter is in a large flow quantity range is measured by closing the

aforementioned No.1 switching valve 10 is closed and ~~opening~~ the No.2 switching valve 11 is opened, and ~~when~~ while a flow rate measured by the differential pressure type flowmeter is in a small quantity range is measured by opening the aforementioned No.1 switching valve 10 is opened and ~~closing~~ the No.2 switching valve 11 is closed.

8. (Currently Amended) A differential pressure type flowmeter as claimed in Claim 4, wherein the switching valve comprises a No.1 switching valve including a first driving cylinder and a No.2 switching valve including a second driving cylinder, wherein it is so constituted that either one of the No.1 switching valve 10 and the No.2 switching valve 11 is made to be a normal/close type valve and the other one is a normal/open type valve, and operating fluid is supplied from one control electromagnetic valve 14 to the first driving cylinder and the second driving cylinder driving cylinders 10a and 10b of both switching valves.

9. (Currently Amended) A differential pressure type flowmeter as claimed in Claim 7, wherein when the differential pressure type flowmeter measures it is so made that a flow rate range up to 100%-10% of the maximum flow rate then is measured by closing the No.1 switching valve 10 is closed and opening the No.2 switching valve is opened 11, and when the differential pressure type flowmeter measures while a flow rate up to 10%-1% of the maximum flow rate then is measured by opening the No.1 switching valve is opened 10 and closing the No.2 switching valve is closed 11.

10. (Currently Amended) A differential pressure type flowmeter as claimed in Claim 7, wherein the further comprising a pressure detector disposed 2 to detect a pressure on the upstream side of the orifice, the pressure detector disposed 3 to detect a pressure on

the downstream side of ~~the~~^a orifice, and ~~the~~^a temperature detector disposed to detect a
temperature on the upstream side of ~~the~~^a orifice, are made sharable ~~by~~^{with} both the first and
the second differential pressure type flowmeters.

11. (Cancelled)

12. (Currently Amended) A differential pressure type flow controller comprising:
a control valve part equipped with a valve driving part;
an orifice installed on ~~a~~^{the} downstream side of the control valve part; thereof;
a detector disposed to detect a fluid pressure P1 on ~~a~~^{the} upstream side of ~~the~~^a orifice;
a detector disposed to detect a fluid pressure P2 on ~~a~~^{the} downstream side of ~~the~~^a orifice;
a detector disposed to detect a fluid temperature T on the upstream side of ~~the~~^a orifice; and
a control computation circuit equipped with a flow rate comparison circuit that
computes ~~where~~ with the fluid's flow rate Q ~~is computed by using the~~ pressure P1, pressure P2
and temperature T detected by the aforementioned detectors, and ~~a~~^{the} difference between
~~the~~^a computed flow rate Q and a set flow rate Qs is computed by the control computation
circuit, and the ~~aforementioned~~ control computation circuit is equipped with a flow rate
computation circuit that computes ~~where~~ with a fluid's flow rate Q using ~~is computed by the~~
equation $Q = C1 \cdot P \sqrt{T} \cdot ((P2/P1)^m \cdot (P2/P1)^n)^{1/2}$ (where C1 is a proportional constant, and m
and n are constants), and further comprising a correction data memory circuit wherein
changes of the pressure P2 on the downstream side of ~~the~~^a orifice are obtained by actual
measurements by the detector disposed to detect pressure P2 on the downstream side of the

~~orifice beforehand~~ and flow rate errors of the aforementioned fluid's flow rate Q are storable in the correction data memory circuit, and ~~thea~~ flow rate correction computation circuit ~~correctsto correct~~ the aforementioned-computed fluid's flow rate Q ~~usingwith~~ the correction data from the correction data memory circuit, thus ~~thea~~ fluid's flow rate Q ~~isbeing~~ corrected depending on ~~the~~ changes of a pressure P_2 on the downstream side of ~~thean~~ orifice, and the corrected flow rate value Q' ~~isQ~~ being inputted to the aforementioned flow rate comparison circuit to compute ~~a~~ the difference of the flow rates $\Delta Q = Q' - Q_s$.

13. (Currently Amended) A differential pressure type flow controller as claimed in Claim 12, wherein the control computation circuit further comprises

a pressure ratio computation circuit ~~to compute that computes a pressure~~ the ratio of a fluid pressure P_1 on the upstream side of ~~thean~~ orifice and a fluid pressure P_2 on the downstream side of ~~thean~~ orifice;

a critical conditions judgment circuit ~~that judges to judge~~ a state of a fluid by comparing the aforementioned-computed pressure ratio and a fluid's critical pressure ratio; and

a No.2 flow rate computation circuit ~~that computes to compute~~ a fluid's flow rate Q by using the equation $Q = KP_1$ (where K is a proportional constant) when the fluid is under critical conditions, ~~and then thea~~ fluid's flow rate Q computed by the aforementioned No.2 fluid computation circuit when the fluid is under critical conditions and a fluid's corrected flow rate value Q' ~~corrected~~ from the flow rate correction computation circuit when the fluid is under non-critical conditions are inputted respectively to the aforementioned flow rate computation circuit.

14. (Currently Amended) A differential pressure type flowmeter characterized in that flow rate measurements ~~are~~can be performed with high accuracy over a wide flow rate range by combining a first differential pressure type flowmeter for measuring a flow rate range of 100%-10% of the maximum flow rate range and a second differential pressure type flowmeter for measuring a flow rate range of 10%-1% of the maximum flow rate range, and by switching a fluid to be measured in accordance with the aforementioned flow rate ranges using a switching valve, to supply ~~the~~ fluid to the first and second differential pressure type flowmeters, wherein one or both of the first and second differential pressure type flowmeters is a differential pressure type flow meter according to claim 2.

15. (Currently Amended) A differential pressure type flowmeter characterized in that flow rate measurements ~~are~~can be performed with high accuracy over a wide flow rate range by combining a first differential pressure type flowmeter for measuring a flow rate range of 100%-10% of the maximum flow rate range and a second differential pressure type flowmeter for measuring a flow rate range of 10%-1% of the maximum flow rate range, and by switching a fluid to be measured in accordance with the aforementioned flow rate ranges using a switching valve, to supply ~~the~~ fluid to the first and second differential pressure type flowmeters, wherein one or both of the first and second differential pressure type flowmeters is a differential pressure type flowmeter according to claim 3.

16. (Currently Amended) A differential pressure type flowmeter as claimed in Claim 7, ~~wherein it is so constituted that either one of the No.1 switching valve and the~~10 or No.2 switching valve ~~is made to be a normal/close type valve comprising a first driving cylinder and the other one is a normal/open type valve comprising a second driving cylinder,~~ and operating fluid is supplied from one control electromagnetic valve ~~Mv~~ to the first driving

cylinder and the second driving cylinder driving cylinders 10a and 10b of both switching valves.

17. (Currently Amended) A differential pressure type flowmeter as claimed in Claim 8, ~~wherein the further comprising a pressure detector disposed~~² to detect a pressure on the upstream side of ~~the an~~ orifice, ~~the a~~ pressure detector ~~disposed~~³ to detect a pressure on the downstream side of ~~the an~~ orifice, and ~~the a~~ temperature detector ~~disposed~~ to detect a temperature on the upstream side of ~~the an~~ orifice; are made sharable ~~by with both the first and second~~ differential pressure type flowmeters.

18. (NEW) A differential pressure type flowmeter characterized in that flow rate measurements are performed with high accuracy over a wide flow rate range by combining a first differential pressure type flowmeter for measuring a flow rate range of 100%-10% of the maximum flow rate range and a second differential pressure type flowmeter for measuring a flow rate range of 10%-1% of the maximum flow rate range, and by switching fluid to be measured in accordance with the aforementioned flow rate ranges using a switching valve, to supply fluid to the first and second differential pressure type flowmeters, wherein each of the first and second differential pressure type flowmeter comprises:

an orifice;

a detector disposed to detect fluid pressure P1 on an upstream side of the orifice;

a detector disposed to detect fluid pressure P2 on a downstream side of the orifice;

a detector disposed to detect fluid temperature T on the upstream side of the orifice;

and

a control computation circuit that computes a fluid's flow rate by using pressure P1, pressure P2, and temperature T detected by the aforementioned detectors, and the fluid's flow

rate Q is computed by the control computation circuit using equation $Q = C1 \cdot P1 \sqrt{T} \cdot ((P2/P1)^m - (P2/P1)^n)^{1/2}$, where $C1$ is a proportional constant, and m and n are constants.

19. (NEW) A differential pressure type flowmeter characterized in that flow rate measurements are performed with high accuracy over a wide flow rate range by combining a first differential pressure type flowmeter for measuring a flow rate range of 100%-10% of the maximum flow rate range and a second differential pressure type flowmeter for measuring a flow rate range of 10%-1% of the maximum flow rate range, and by switching fluid to be measured in accordance with the aforementioned flow rate ranges using a switching valve, to supply fluid to the first and second differential pressure type flowmeters, wherein each of the first and second differential pressure type flowmeters is a differential pressure type flowmeter comprising:

- an orifice;
- a detector disposed to detect fluid pressure $P1$ on an upstream side of the orifice;
- a detector disposed to detect fluid pressure $P2$ on a downstream side of the orifice;
- a detector disposed to detect fluid temperature T on the upstream side of the orifice;

and

- a control computation circuit that computes a fluid's flow rate using pressure $P1$, pressure $P2$, and temperature T detected by the aforementioned detectors, and the control computation circuit is equipped with a flow rate computation circuit that computes fluid's flow rate Q using equation $Q = C1 \cdot P1 \sqrt{T} \cdot ((P2/P1)^m - (P2/P1)^n)^{1/2}$, where $C1$ is a proportional constant, and m and n are constants, and further comprising a correction data memory circuit wherein changes of pressure $P2$ on the downstream side of the orifice are obtained by actual measurement by the detector disposed to detect fluid pressure $P2$ on the downstream side of the orifice, and flow rate errors of the fluid's flow rate are storable in the

correction data memory circuit, and a flow rate correction computation circuit corrects the computed fluid's flow rate Q using correction data from the correction data memory circuit, thus computed fluid's flow rate Q is corrected depending on changes of pressure P_2 on the downstream side of the orifice to output a corrected flow rate Q' .